

## **ELECTROPHOTOGRAPHIC RECORDER**

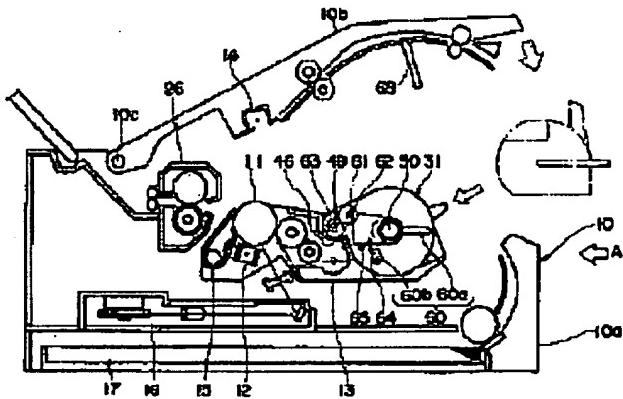
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**Inventor:** MOTOHASHI TAKESHI; TANAKA YOSHIAKI;  
TANZAWA ATSUSHI; MATSUMAE IWAO; MIYAMOTO  
MASAYOSHI; TAMIYA TAKAHIRO  
**Applicant:** RICOH KK  
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- **international:** G03G15/00; G03G15/08; G03G15/00; G03G15/08;  
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- **european:**  
**Application number:** JP19920213296 19920717  
**Priority number(s):** JP19920213296 19920717

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### Abstract of JP6035321

**PURPOSE:** To improve operability when the toner replenishing is carried out by opening a shutter of a toner cartridge after the toner cartridge is attached to a developing device.

**CONSTITUTION:** The shutter is provided to freely rotate and seal an opening 46 in the toner cartridge 31, while an inputting gear 63 is provided on one edge of the shutter, an idler gear 61 engaged with the inputting gear 63 and a rotating member 60 which is engaged with the idler gear 61 are provided. The rotating member 60 is provided to freely rotate on one edge of an agitator shaft 50 of the toner cartridge 31 and one end of an energizing member 64 energizing in the direction to close the shutter is hooked onto the rotational member 60. On the other hand, an actuating protrusion 68 is provided in a top construction body 10b to be engaged with the rotational member 60 when being closed and to rotate the rotational member 60 against the energizing member 64. Then, after the toner cartridge 31 is attached to the developing device 13, the shutter is opened or closed in a motion linked with the opening/ closing action of the top construction body 10b of the device main body.



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**Family list**

1 family member for:

**JP6035321**

Derived from 1 application.

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**1 ELECTROPHOTOGRAPHIC RECORDER**

Publication info: **JP6035321 A** - 1994-02-10

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] The opening is plugged up to a toner cartridge and a shutter is formed. The toner cartridge Attach in the development counter with which the body of equipment is equipped, open said shutter, close covering of said body of equipment, and this body of equipment is driven. In the electrophotography recording device which supplies the toner in said toner cartridge to said development counter through said opening, and develops the latent image on a photo conductor with the development counter The switching action of said covering after attaching said toner cartridge in said development counter is interlocked with, and they are closing or the electrophotography recording device which it comes to open about said shutter.

[Claim 2] The electrophotography recording device according to claim 1 which forms said shutter by the shaft-like part material which has the through tube of the direction of a path, and becomes as a configuration which it rotates through said gear train while equipping said toner cartridge with the rotation member which is interlocked with the switching action of said covering and rotated, and the gear train which transmits rotation of the rotation member.

[Claim 3] The electrophotography recording device according to claim 1 which comes to prepare the energization member energized in the direction which closes said shutter.

[Claim 4] The electrophotography recording device according to claim 1 which comes to prepare for said toner cartridge opening covering which is interlocked with attachment-and-detachment actuation of said toner cartridge in gravity balance, and carries out the switching action of said opening.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Industrial Application] This invention relates to the electrophotography recording device which used laser and which a printer, a copying machine, facsimile, etc. attach a toner cartridge in a development counter, supplies a toner to a development counter, adheres a toner with that development counter, and develops the latent image on a photo conductor.

#### [0002]

[Description of the Prior Art] Conventionally, as shown in drawing 14, there are some which closed the opening 1a to the toner cartridge 1, and formed the shutter 2 in it free [ rotation ] in a laser beam printer. such a laser beam printer shows to drawing 13 after attaching a toner cartridge 1, as a two-dot chain line shows to wearing crevice 3a of a development counter 3 -- it rotated by hand to the direction indicated by the arrow, opening 1a was opened, and the toner t in a toner cartridge 1 was supplied to the development counter 3 through opening 1a (refer to JP,3-175471,A).

#### [0003]

[Problem(s) to be Solved by the Invention] However, in such a conventional laser beam printer, after attaching a toner cartridge 1 in a development counter 3, the toner cartridge 1 had to be rotated by hand, opening 1a had to be opened, and it was troublesome.

[0004] Then, after attaching a toner cartridge in a development counter, the purpose of this invention is shown in aiming at improvement in that operability, when opening the shutter of that toner cartridge and performing toner supply.

#### [0005]

[Means for Solving the Problem] A thing according to claim 1 Therefore, for example, as being shown in the following illustration examples, Plug up the opening 46 to a toner cartridge 31, and a shutter 48 is formed in it. Attach the toner cartridge 31 in the development counter 13 with which the body 10 of equipment is equipped, and said shutter 48 is opened. Close covering like upper structure 10b of said body 10 of equipment, and this body 10 of equipment is driven. In the electrophotography recording device which supplies the toner t in said toner cartridge 31 to said development counter 13 through said opening 46, and develops the latent image on a photo conductor 11 with the development counter 13 After attaching said toner cartridge 31 in said development counter 13, the switching action of said covering is interlocked with and said shutter 48 is characterized by closing or coming to open.

[0006] A thing according to claim 2 is set to an electrophotography recording device according to claim 1 as it is shown in the following illustration examples. While equipping said toner cartridge 31 with the rotation member 60 which is interlocked with the switching action of said covering and rotated, and the gear train which transmits rotation of the rotation member 60 and which consists of an idler gear 61 or an input gear 63, for example Said shutter 48 is formed by the shaft-like part material which has through tube 48a of the direction of a path, and it is characterized by becoming as a configuration which it rotates through said gear train.

[0007] A thing according to claim 3 is characterized by coming to prepare the energization member 64 energized in an electrophotography recording device according to claim 1 in the direction which closes said shutter 48 as shown in the following illustration examples.

[0008] A thing according to claim 4 is characterized by coming to prepare for said toner cartridge 31 the opening covering 70 which is interlocked with attachment-and-detachment actuation of said toner cartridge 31 in gravity balance, and carries out the switching action of said opening 46 in an electrophotography recording

apparatus according to claim 1 as shown in the following illustration examples.

[0009]

[Function] And in invention according to claim 1, after attaching a toner cartridge 31 in a development counter 13, if covering of the body 10 of equipment is opened and closed, it will be interlocked with, and the shutter 48 of a toner cartridge 31 will be closed or opened. Then, when a shutter 48 is opened, the toner t in a toner cartridge 31 is supplied to a development counter 13 through opening 46.

[0010] In a thing according to claim 2, the switching action of covering of the body 10 of equipment is interlocked with, the rotation member 60 is rotated, rotation of the rotation member 60 is transmitted to a shutter 48 through the gear train, a shutter 48 is rotated, and opening 46 is opened and closed.

[0011] In a thing according to claim 3, it energizes in the direction which closes a shutter 48 by the energization member 64.

[0012] Attachment-and-detachment actuation of a toner cartridge 31 is interlocked with, and the opening covering 70 opens in a thing according to claim 4 and closes the opening 46 in gravity balance.

[0013]

[Example] Hereafter, it explains per example of this invention, referring to a drawing. The outline configuration of the whole internal device of the laser beam printer which is one example of this invention is shown in drawing 12.

[0014] The sign 10 in drawing is a body of equipment. It constitutes from bottom structure 10a and upper structure 10b which is the covering, and as for the body 10 of equipment, shaft 10c is attached for it free [ closing motion ] to bottom structure 10a, using the upper structure 10b as the supporting point. the inside of this body 10 of equipment -- the -- the drum-like photo conductor 11 is mostly formed in the center. the surroundings of the photo conductor 11 -- to the hand of cut (counterclockwise rotation) of this photo conductor 11, in order, on right-hand side, the imprint machine 14 is arranged to a development counter 13 and the up side, and the cleaning machine 15 is arranged from the lower electrification machine 12 at left-hand side. And the electrification machine 12 and cleaning machine 15 bottom is equipped with the vessel 16 write-in [ optical ]. A sheet paper cassette 17 is attached in the pan of the vessel 16 write-in [ optical ] free [ attachment and detachment ] at the bottom. Sheet S is contained in a sheet paper cassette 17. And a right-hand side [ of a development counter 13 ], i.e., transverse plane shown by arrow head A, side is equipped with the feed way 21 to which the sheet S which rotated and sent out the feed roller 20 is led upwards. The sheet S inserted from the manual paper feed opening 22 and the common conveyance way 23 are established in the point of the feed way 21. the conveyance way 23 -- on the way -- being alike -- a resist roller pair -- 24 is arranged.

[0015] said imprint machine 14 -- between -- inserting -- this -- a resist roller pair 24 and opposite side is equipped with a fixing assembly 26. Furthermore, the delivery way 27 is established in the left-hand side of a fixing assembly 26, and the delivery receptacle 28 is installed in the point. In addition, it comes to prepare a display panel (illustration abbreviation) for the body 10 of equipment at 10d of up inclined planes by the side of [ A ] a transverse plane.

[0016] A deer is carried out, in an illustration laser beam printer, it stands on the transverse-plane side A, and the above-mentioned display panel is operated suitably. and the feed roller 20 -- rotating -- Sheet S -- every one out of a sheet paper cassette 17 -- the feed way 21 -- sending out -- the conveyance way 23 -- letting it pass -- the tip of Sheet S -- a resist roller pair -- it dashes against 24 and stops.

[0017] On the other hand, rotating to the counterclockwise rotation in drawing, the front face is uniformly charged with the electrification vessel 12, then, a laser beam is irradiated with the vessel 16 write-in [ optical ], a photo conductor 11 forms an electrostatic latent image in the front face, and when it passes along a development counter 13 continuously, it forms the electrostatic latent image into a visible image serially with a toner. and the visible image and timing -- doubling -- the above-mentioned resist roller pair -- the sheet S which had dashed against 24 is turned to a photo conductor 11, and is sent out. A deer is carried out and the visible image on the photo conductor 11 is imprinted on this sheet S with the imprint vessel 14. It is failed after an imprint to write the residual toner on a photo conductor 11 with the cleaning blade 29 of the cleaning machine 15.

[0018] On the other hand, a transfer picture is established by delivery and its fixing assembly 26 to a fixing assembly 26 in the sheet S after an imprint. After image fixing, this sheet S is discharged and a stack is carried out one by one on the delivery receptacle 28 through the delivery way 27.

[0019] By the way, as shown in drawing 10 and drawing 11, the development counter 13 mentioned above

prepares attachment crevice 30a in the 1 side of the development counter case 30, and prepares attachment guide crevice 30b in the both-ends inside. Moreover, this development counter case 30 comes to attach a photo conductor 11, the electrification machine 12, and the cleaning machine 15 in the side else in one. A deer is carried out and it comes to form a processing laboratory 32 in the right-hand side of a photo conductor 11. The roller aperture 33 is opened in the die-length direction of the processing laboratory 32, and it comes to open in a roller aperture 33 and opposite side the opening 34 which turns opening upward at the photo conductor 11 side of the processing laboratory 32. And it comes to contain the developing roller 35 which exposes a part from the roller aperture 33 in this processing laboratory 32, and contacts photo conductor 11 peripheral surface, the supply roller 36 in contact with that developing roller 35, and the mini agitator 37 respectively free [ rotation ]. Moreover, it comes to press the tip of the thin layer blade 38 against the periphery of a developing roller 35.

[0020] Said cleaning machine 15 is formed for the 1st auger 41 in the lower part, enabling free rotation while it forms the waste toner recovery room 39 in the die-length direction of a photo conductor 11. It comes to connect with the edge of the waste toner recovery room 39 the end of the waste toner conveyance way 40 shown in drawing 9. The waste toner conveyance way 40 is formed in drawing Nakamigi slanting facing up, is established for the 2nd auger 42 in the interior, enabling free rotation, and comes to prepare \*\* downward toner abandonment opening 40a in the other end.

[0021] As shown in drawing 10 and drawing 11, a toner cartridge 31 is attached enabling free attachment and detachment, and it becomes the development counter mentioned above. The whole is equipped with the shape of a cylindrical shape, and a toner cartridge 31 is equipped with a toner compartment 44 in nothing and the center as it is shown in drawing 8. A toner compartment 44 forms projected part 44a of the direction of a path in the external surface at shaft orientations while forming the toner room 45 in the interior. Cartridge plane-of-composition 44b extended in the direction of a path is prepared in projected part 44a, and it comes to open in the plane-of-composition 44b the opening 46 shown in drawing 11. While forming the seal member 47 in an inside in the opening 46 periphery, the seal member 47 is contacted and a shutter 48 is formed in the interior. A shutter 48 is the shaft-like part material of a cross-section round shape, and shank 48b is formed in an end and it forms D mold boss 48c in the other end, respectively while it forms two or more through tube 48a of the direction of a path, as shown in drawing 8. And while inserting shank 48b in boss 44c by the side of the end of a toner compartment 44, the end of D mold shank 49 is attached in D mold boss 48c, and it prepares in it free [ rotation ]. It comes to insert D mold shank 49 in boss 44c by the side of the other end of a toner compartment 44, and it is prepared in an input gear 63 and one.

[0022] Moreover, it penetrates to a longitudinal direction and the agitator shaft 50 is formed in said toner compartment 44. It comes to attach the end face of the tabular agitator 51 in the pars intermedia of the agitator shaft 50. An agitator 51 attaches polyester film 52 at a tip, and comes to press it against the internal surface of the toner room 45. <BR> [0023] On the other hand, the agitator gear 53 and its gear covering 54 are attached in the end 50a side of the agitator shaft 50. The gear covering 54 comes to prepare opening 54c in cylinder-like side-attachment-wall 54b while having tubed projection 54a which is a cap-like and inserts in end 50a of the agitator shaft 50 centering on an inner bottom.

[0024] On the other hand, it comes to attach the waste toner tank 55 in the other end 50b side of the agitator shaft 50. The waste toner tank 55 has through tube 55a to which the shape of a cylinder is inserted in the whole and it inserts other end 50b of the agitator shaft 50 in nothing and a core mostly, forms crevice 55b outside, and comes to open waste toner receiving window 55c there.

[0025] Furthermore, both-ends 56b of a handle 56 is attached in both-ends 50a and 50b of the agitator shaft 50. Both-ends 56b of a handle 56 is bent at a right angle from the both ends of central grasping section 56a, and it is lengthened mutual almost in parallel and it comes to form it. And it inserts by both-ends 56b of a handle 56, and said gear covering 54 and the waste toner tank 55 are fixed on the agitator shaft 50.

[0026] And when attaching such a toner cartridge 31 in a development counter 13, as shown in drawing 1, it stands on the transverse-plane the body 10 of equipment side A, and upper structure 10b which is covering is opened. And it inserts [ which shows both-ends 56b to drawing 10 with a handle 56 ] in attachment guide crevice 30b from \*\*\*\*\*, it shows around by the attachment guide crevice 30b, and a toner cartridge 31 is put in in attachment crevice 30a. Then, as shown in drawing 9, while doubling waste toner receiving window 55c of the waste toner tank 55 with toner abandonment opening 40a, as it rotates counterclockwise and a toner compartment 44 is shown in drawing 11, opening 46 is made consistent with an opening 34, and as shown in drawing 1, a toner cartridge 31 is attached in a development counter 13.

[0027] Now, in this example, as shown in drawing 1 and drawing 8, the rotation member 60 is formed between the toner compartment 44 of a toner cartridge 31, and the waste toner tank 55. The rotation member 60 is equipped with heights 60a and gear section 60b in the direction of a path, and attaches them in the other end 50b side of said agitator shaft 50 free [ free rotation ]. It engages with gear section 60b of the rotation member 60, and the idler gear 61 is formed. The idler gear 61 is supported with a shaft 62, is engaged with the input gear 63 of said shutter 48 to the other end side of said toner compartment 44, and is prepared in it. Moreover, it hangs and comes to stop the end of the energization member 64 to the gear section 60b side of said rotation member 60. The other end of the energization member 64 is hung on the proper location of a toner compartment 44, and is stopped. And it holds in the closing condition which it energizes by this energization member 64, and gear section 60b of the rotation member 60 is shown in reliance, and shows said shutter 48 in drawing 2 per projection 65.

[0028] On the other hand, the actuation projected part 68 which engages with said rotation member 60 and rotates the rotation member 60 is formed in said upper structure 10b. The actuation projected part 68 is formed in the shape of a rod, turns a tip to the rotation member 60, and prepares it downward.

[0029] Then, as shown in drawing 1, if it closes as upper structure 10b is rotated to the direction indicated by the arrow and it is shown in drawing 3 after attaching a toner cartridge 31 in a development counter 13, heights 60a of the drive gear 60 will be depressed at the tip of a control unit 68, and it rotates to the clockwise rotation which resists the energization member 64 and \*\*\*\* the drive gear 60. Then, as the idler gear 61 and an input gear 63 rotate to the direction indicated by the arrow, respectively, it rotates to a clockwise rotation from the closing condition which shows said shutter 48 in drawing 2 and it is shown in drawing 4, it opens.

[0030] A deer is carried out, at the time of record, with a development counter 13, the rotation from a drive motor which carries out an illustration abbreviation is transmitted to the agitator shaft 50 through the agitator gear 53, it is rotated, and an agitator 51 is rotated. And it sends in into a processing laboratory 32 from an opening 34 through tube 48a and opening 46 from the toner room 45, agitating Toner t by the agitator 51, as shown in drawing 11. And the sent-in toner t is sent to the supply roller 36 by the mini agitator 37, and it adheres to a developing roller 35 with the supply roller 36 further. Lamination of the adhering toner t is dammed up and carried out at the tip of the thin layer blade 38. A deer is carried out, this toner t is adhered to a photo conductor 11 through the roller aperture 33 with a developing roller 35, and the electrostatic latent image of photo conductor 11 front face is formed into a visible image.

[0031] And it is failed after an imprint to write the residual toner t on a photo conductor 11 to the waste toner recovery room 39 with the cleaning blade 29 of the cleaning machine 15. A deer is carried out and this waste toner t is carried to the edge side of the waste toner recovery room 39 by rotation of the 1st auger 41, and further, as shown in drawing 9, it conveys through the waste toner conveyance way 40 by rotation of the 2nd auger 42, and collects in the waste toner tank 55 through toner abandonment opening 40a and waste toner receiving window 55c.

[0032] Then, when Toner t is lost and the exchange display of a toner cartridge 31 is made by said display panel, as shown in drawing 1, upper structure 10b is opened. Then, the actuation projected part 68 separates from the rotation member 60, and rotates to the counterclockwise rotation which energizes and \*\*\*\* the rotation member 60 by the energization member 64. Therefore, as said idler gear 61 and input gear 63 rotate to the direction indicated by the arrow, respectively, it rotates to a counterclockwise rotation from the aperture condition which shows said shutter 48 in drawing 4 and it is shown in drawing 2, it closes. A deer is carried out, a toner cartridge 31 is pulled out from attachment crevice 30a of a development counter 13 with a handle 56, and it exchanges for the new toner cartridge 31. After exchange, if upper structure 10b is closed, as it is interlocked with and being mentioned above, a shutter 48 will be opened automatically.

[0033] In addition, the toner cartridge 31 mentioned above is good to consider as the configuration shown in drawing 5. The sign 70 in drawing is opening covering. The opening covering 70 bends both ends at a right angle, and forms bending section 70b while it forms partial cylinder curved-surface 70a in the shaft orientations of a toner cartridge 31 long and slender. And it plays to the outer edge of D mold shank 49 and shank 48b, and the bending section 70b is attached free [ rotation ]. Moreover, the balance controller 71 is formed in the periphery of bending section 70b. And the gravity balance of the opening covering 70 is maintained by the balance controller 71, and covering section 70a always considers as a sideways level condition.

[0034] If it rotates to the counterclockwise rotation which \*\*\*\* after putting in a toner cartridge 31 in installation crevice 30a of the development counter case 30 as shown in drawing 6 when carrying out a deer and

attaching a toner cartridge 31 in a development counter 13, along with rotation of a toner cartridge 31, opening 46 will open downward. And as shown in drawing 7, the opening 46 of a toner cartridge 31 is attached according to the opening 34 of a development counter 13. On the other hand, if the toner cartridge 31 is rotated to a clockwise rotation when removing a toner cartridge 31 from a development counter 13, along with rotation of a toner cartridge 31, opening 46 will serve as sideways, and covering section 70a will close the opening 46.

[0035]

[Effect of the Invention] Therefore, according to this invention, after attaching a toner cartridge in a development counter, if covering of the body of equipment is opened and closed, it can be interlocked with, closing or the trouble which opens a shutter by hand when opening a shutter and supplying a toner, since it opens can be abolished for the shutter of a toner cartridge, and operability can be raised.

[0036] Since it energizes in the direction which closes a shutter by the energization member according to the thing according to claim 3, a shutter can be closed certainly.

[0037] Since according to the thing according to claim 4 attachment-and-detachment actuation of a toner cartridge is interlocked with and the opening is opened and closed with opening covering, when removing a toner cartridge from a development counter, the toner which covered opening with opening covering and adhered to the opening can prevent dispersing outside.

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**TECHNICAL FIELD**

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[Industrial Application] This invention relates to the electrophotography recording device which used laser and which a printer, a copying machine, facsimile, etc. attach a toner cartridge in a development counter, supplies a toner to a development counter, adheres a toner with that development counter, and develops the latent image on a photo conductor.

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**PRIOR ART**

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[Description of the Prior Art] Conventionally, as shown in drawing 14 , there are some which closed the opening 1a to the toner cartridge 1, and formed the shutter 2 in it free [ rotation ] in a laser beam printer. such a laser beam printer shows to drawing 13 after attaching a toner cartridge 1, as a two-dot chain line shows to wearing crevice 3a of a development counter 3 -- it rotated by hand to the direction indicated by the arrow, opening 1a was opened, and the toner t in a toner cartridge 1 was supplied to the development counter 3 through opening 1a (refer to JP,3-175471,A).

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] Therefore, according to this invention, after attaching a toner cartridge in a development counter, if covering of the body of equipment is opened and closed, it can be interlocked with, closing or the trouble which opens a shutter by hand when opening a shutter and supplying a toner, since it opens can be abolished for the shutter of a toner cartridge, and operability can be raised.

[0036] Since it energizes in the direction which closes a shutter by the energization member according to the thing according to claim 3, a shutter can be closed certainly.

[0037] Since according to the thing according to claim 4 attachment-and-detachment actuation of a toner cartridge is interlocked with and the opening is opened and closed with opening covering, when removing a toner cartridge from a development counter, the toner which covered opening with opening covering and adhered to the opening can prevent dispersing outside.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, in such a conventional laser beam printer, after attaching a toner cartridge 1 in a development counter 3, the toner cartridge 1 had to be rotated by hand, opening 1a had to be opened, and it was troublesome.

[0004] Then, after attaching a toner cartridge in a development counter, the purpose of this invention is shown in aiming at improvement in that operability, when opening the shutter of that toner cartridge and performing toner supply.

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**MEANS**

[Means for Solving the Problem] A thing according to claim 1 Therefore, for example, as being shown in the following illustration examples, Plug up the opening 46 to a toner cartridge 31, and a shutter 48 is formed in it. Attach the toner cartridge 31 in the development counter 13 with which the body 10 of equipment is equipped, and said shutter 48 is opened. Close covering like upper structure 10b of said body 10 of equipment, and this body 10 of equipment is driven. In the electrophotography recording device which supplies the toner t in said toner cartridge 31 to said development counter 13 through said opening 46, and develops the latent image on a photo conductor 11 with the development counter 13 After attaching said toner cartridge 31 in said development counter 13, the switching action of said covering is interlocked with and said shutter 48 is characterized by closing or coming to open.

[0006] A thing according to claim 2 is set to an electrophotography recording device according to claim 1 as it is shown in the following illustration examples. While equipping said toner cartridge 31 with the rotation member 60 which is interlocked with the switching action of said covering and rotated, and the gear train which transmits rotation of the rotation member 60 and which consists of an idler gear 61 or an input gear 63, for example Said shutter 48 is formed by the shaft-like part material which has through tube 48a of the direction of a path, and it is characterized by becoming as a configuration which it rotates through said gear train.

[0007] A thing according to claim 3 is characterized by coming to prepare the energization member 64 energized in an electrophotography recording device according to claim 1 in the direction which closes said shutter 48 as shown in the following illustration examples.

[0008] A thing according to claim 4 is characterized by coming to prepare for said toner cartridge 31 the opening covering 70 which is interlocked with attachment-and-detachment actuation of said toner cartridge 31 in gravity balance, and carries out the switching action of said opening 46 in an electrophotography recording apparatus according to claim 1 as shown in the following illustration examples.

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**OPERATION**

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[Function] And in invention according to claim 1, after attaching a toner cartridge 31 in a development counter 13, if covering of the body 10 of equipment is opened and closed, it will be interlocked with, and the shutter 48 of a toner cartridge 31 will be closed or opened. Then, when a shutter 48 is opened, the toner t in a toner cartridge 31 is supplied to a development counter 13 through opening 46.

[0010] In a thing according to claim 2, the switching action of covering of the body 10 of equipment is interlocked with, the rotation member 60 is rotated, rotation of the rotation member 60 is transmitted to a shutter 48 through the gear train, a shutter 48 is rotated, and opening 46 is opened and closed.

[0011] In a thing according to claim 3, it energizes in the direction which closes a shutter 48 by the energization member 64.

[0012] Attachment-and-detachment actuation of a toner cartridge 31 is interlocked with, and the opening covering 70 opens in a thing according to claim 4 and closes the opening 46 in gravity balance.

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## EXAMPLE

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[Example] Hereafter, it explains per example of this invention, referring to a drawing. The outline configuration of the whole internal device of the laser beam printer which is one example of this invention is shown in drawing 12.

[0014] The sign 10 in drawing is a body of equipment. It constitutes from bottom structure 10a and upper structure 10b which is the covering, and as for the body 10 of equipment, shaft 10c is attached for it free [ closing motion ] to bottom structure 10a, using the upper structure 10b as the supporting point. the inside of this body 10 of equipment -- the -- the drum-like photo conductor 11 is mostly formed in the center. the surroundings of the photo conductor 11 -- to the hand of cut (counterclockwise rotation) of this photo conductor 11, in order, on right-hand side, the imprint machine 14 is arranged to a development counter 13 and the up side, and the cleaning machine 15 is arranged from the lower electrification machine 12 at left-hand side. And the electrification machine 12 and cleaning machine 15 bottom is equipped with the vessel 16 write-in [ optical ]. A sheet paper cassette 17 is attached in the pan of the vessel 16 write-in [ optical ] free [ attachment and detachment ] at the bottom. Sheet S is contained in a sheet paper cassette 17. And a right-hand side [ of a development counter 13 ], i.e., transverse plane shown by arrow head A, side is equipped with the feed way 21 to which the sheet S which rotated and sent out the feed roller 20 is led upwards. The sheet S inserted from the manual paper feed opening 22 and the common conveyance way 23 are established in the point of the feed way 21. the conveyance way 23 -- on the way -- being alike -- a resist roller pair -- 24 is arranged.

[0015] said imprint machine 14 -- between -- inserting -- this -- a resist roller pair 24 and opposite side is equipped with a fixing assembly 26. Furthermore, the delivery way 27 is established in the left-hand side of a fixing assembly 26, and the delivery receptacle 28 is installed in the point. In addition, it comes to prepare a display panel (illustration abbreviation) for the body 10 of equipment at 10d of up inclined planes by the side of [ A ] a transverse plane.

[0016] A deer is carried out, in an illustration laser beam printer, it stands on the transverse-plane side A, and the above-mentioned display panel is operated suitably. and the feed roller 20 -- rotating -- Sheet S -- every one out of a sheet paper cassette 17 -- the feed way 21 -- sending out -- the conveyance way 23 -- letting it pass -- the tip of Sheet S -- a resist roller pair -- it dashes against 24 and stops.

[0017] On the other hand, rotating to the counterclockwise rotation in drawing, the front face is uniformly charged with the electrification vessel 12, then, a laser beam is irradiated with the vessel 16 write-in [ optical ], a photo conductor 11 forms an electrostatic latent image in the front face, and when it passes along a development counter 13 continuously, it forms the electrostatic latent image into a visible image serially with a toner. and the visible image and timing -- doubling -- the above-mentioned resist roller pair -- the sheet S which had dashed against 24 is turned to a photo conductor 11, and is sent out. A deer is carried out and the visible image on the photo conductor 11 is imprinted on this sheet S with the imprint vessel 14. It is failed after an imprint to write the residual toner on a photo conductor 11 with the cleaning blade 29 of the cleaning machine 15.

[0018] On the other hand, a transfer picture is established by delivery and its fixing assembly 26 to a fixing assembly 26 in the sheet S after an imprint. After image fixing, this sheet S is discharged and a stack is carried out one by one on the delivery receptacle 28 through the delivery way 27.

[0019] By the way, as shown in drawing 10 and drawing 11, the development counter 13 mentioned above prepares attachment crevice 30a in the 1 side of the development counter case 30, and prepares attachment guide crevice 30b in the both-ends inside. Moreover, this development counter case 30 comes to attach a photo conductor 11, the electrification machine 12, and the cleaning machine 15 in the side else in one. A deer is

carried out and it comes to form a processing laboratory 32 in the right-hand side of a photo conductor 11. The roller aperture 33 is opened in the die-length direction of the processing laboratory 32, and it comes to open in a roller aperture 33 and opposite side the opening 34 which turns opening upward at the photo conductor 11 side of the processing laboratory 32. And it comes to contain the developing roller 35 which exposes a part from the roller aperture 33 in this processing laboratory 32, and contacts photo conductor 11 peripheral surface, the supply roller 36 in contact with that developing roller 35, and the mini agitator 37 respectively free [ rotation ]. Moreover, it comes to press the tip of the thin layer blade 38 against the periphery of a developing roller 35.

[0020] Said cleaning machine 15 is formed for the 1st auger 41 in the lower part, enabling free rotation while it forms the waste toner recovery room 39 in the die-length direction of a photo conductor 11. It comes to connect with the edge of the waste toner recovery room 39 the end of the waste toner conveyance way 40 shown in drawing 9. The waste toner conveyance way 40 is formed in drawing Nakamigi slanting facing up, is established for the 2nd auger 42 in the interior, enabling free rotation, and comes to prepare \*\* downward toner abandonment opening 40a in the other end.

[0021] As shown in drawing 10 and drawing 11, a toner cartridge 31 is attached enabling free attachment and detachment, and it becomes the development counter mentioned above. The whole is equipped with the shape of a cylindrical shape, and a toner cartridge 31 is equipped with a toner compartment 44 in nothing and the center as it is shown in drawing 8. A toner compartment 44 forms projected part 44a of the direction of a path in the external surface at shaft orientations while forming the toner room 45 in the interior. Cartridge plane-of-composition 44b extended in the direction of a path is prepared in projected part 44a, and it comes to open in the plane-of-composition 44b the opening 46 shown in drawing 11. While forming the seal member 47 in an inside in the opening 46 periphery, the seal member 47 is contacted and a shutter 48 is formed in the interior. A shutter 48 is the shaft-like part material of a cross-section round shape, and shank 48b is formed in an end and it forms D mold boss 48c in the other end, respectively while it forms two or more through tube 48a of the direction of a path, as shown in drawing 8. And while inserting shank 48b in boss 44c by the side of the end of a toner compartment 44, the end of D mold shank 49 is attached in D mold boss 48c, and it prepares in it free [ rotation ]. It comes to insert D mold shank 49 in boss 44c by the side of the other end of a toner compartment 44, and it is prepared in an input gear 63 and one.

[0022] Moreover, it penetrates to a longitudinal direction and the agitator shaft 50 is formed in said toner compartment 44. It comes to attach the end face of the tabular agitator 51 in the pars intermedia of the agitator shaft 50. An agitator 51 attaches polyester film 52 at a tip, and comes to press it against the internal surface of the toner room 45.

[0023] On the other hand, the agitator gear 53 and its gear covering 54 are attached in the end 50a side of the agitator shaft 50. The gear covering 54 comes to prepare opening 54c in cylinder-like side-attachment-wall 54b while having tubed projection 54a which is a cap-like and inserts in end 50a of the agitator shaft 50 centering on an inner bottom.

[0024] On the other hand, it comes to attach the waste toner tank 55 in the other end 50b side of the agitator shaft 50. The waste toner tank 55 has through tube 55a to which the shape of a cylinder is inserted in the whole and it inserts other end 50b of the agitator shaft 50 in nothing and a core mostly, forms crevice 55b outside, and comes to open waste toner receiving window 55c there.

[0025] Furthermore, both-ends 56b of a handle 56 is attached in both-ends 50a and 50b of the agitator shaft 50. Both-ends 56b of a handle 56 is bent at a right angle from the both ends of central grasping section 56a, and it is lengthened mutual almost in parallel and it comes to form it. And it inserts by both-ends 56b of a handle 56, and said gear covering 54 and the waste toner tank 55 are fixed on the agitator shaft 50.

[0026] And when attaching such a toner cartridge 31 in a development counter 13, as shown in drawing 1, it stands on the transverse-plane the body 10 of equipment side A, and upper structure 10b which is covering is opened. And it inserts [ which shows both-ends 56b to drawing 10 with a handle 56 ] in attachment guide crevice 30b from \*\*\*\*, it shows around by the attachment guide crevice 30b, and a toner cartridge 31 is put in in attachment crevice 30a. Then, as shown in drawing 9, while doubling waste toner receiving window 55c of the waste toner tank 55 with toner abandonment opening 40a, as it rotates counterclockwise and a toner compartment 44 is shown in drawing 11, opening 46 is made consistent with an opening 34, and as shown in drawing 1, a toner cartridge 31 is attached in a development counter 13.

[0027] Now, in this example, as shown in drawing 1 and drawing 8, the rotation member 60 is formed between the toner compartment 44 of a toner cartridge 31, and the waste toner tank 55. The rotation member 60 is

equipped with heights 60a and gear section 60b in the direction of a path, and attaches them in the other end 50b side of said agitator shaft 50 free [ free rotation ]. It engages with gear section 60b of the rotation member 60, and the idler gear 61 is formed. The idler gear 61 is supported with a shaft 62, is engaged with the input gear 63 of said shutter 48 to the other end side of said toner compartment 44, and is prepared in it. Moreover, it hangs and comes to stop the end of the energization member 64 to the gear section 60b side of said rotation member 60. The other end of the energization member 64 is hung on the proper location of a toner compartment 44, and is stopped. And it holds in the closing condition which it energizes by this energization member 64, and gear section 60b of the rotation member 60 is shown in reliance, and shows said shutter 48 in drawing 2 per projection 65.

[0028] On the other hand, the actuation projected part 68 which engages with said rotation member 60 and rotates the rotation member 60 is formed in said upper structure 10b. The actuation projected part 68 is formed in the shape of a rod, turns a tip to the rotation member 60, and prepares it downward.

[0029] Then, as shown in drawing 1, if it closes as upper structure 10b is rotated to the direction indicated by the arrow and it is shown in drawing 3 after attaching a toner cartridge 31 in a development counter 13, heights 60a of the drive gear 60 will be depressed at the tip of a control unit 68, and it rotates to the clockwise rotation which resists the energization member 64 and \*\*\*\* the drive gear 60. Then, as the idler gear 61 and an input gear 63 rotate to the direction indicated by the arrow, respectively, it rotates to a clockwise rotation from the closing condition which shows said shutter 48 in drawing 2 and it is shown in drawing 4, it opens.

[0030] A deer is carried out, at the time of record, with a development counter 13, the rotation from a drive motor which carries out an illustration abbreviation is transmitted to the agitator shaft 50 through the agitator gear 53, it is rotated, and an agitator 51 is rotated. And it sends in into a processing laboratory 32 from an opening 34 through through tube 48a and opening 46 from the toner room 45, agitating Toner t by the agitator 51, as shown in drawing 11. And the sent-in toner t is sent to the supply roller 36 by the mini agitator 37, and it adheres to a developing roller 35 with the supply roller 36 further. Lamination of the adhering toner t is dammed up and carried out at the tip of the thin layer blade 38. A deer is carried out, this toner t is adhered to a photo conductor 11 through the roller aperture 33 with a developing roller 35, and the electrostatic latent image of photo conductor 11 front face is formed into a visible image.

[0031] And it is failed after an imprint to write the residual toner t on a photo conductor 11 to the waste toner recovery room 39 with the cleaning blade 29 of the cleaning machine 15. A deer is carried out and this waste toner t is carried to the edge side of the waste toner recovery room 39 by rotation of the 1st auger 41, and further, as shown in drawing 9, it conveys through the waste toner conveyance way 40 by rotation of the 2nd auger 42, and collects in the waste toner tank 55 through toner abandonment opening 40a and waste toner receiving window 55c.

[0032] Then, when Toner t is lost and the exchange display of a toner cartridge 31 is made by said display panel, as shown in drawing 1, upper structure 10b is opened. Then, the actuation projected part 68 separates from the rotation member 60, and rotates to the counterclockwise rotation which energizes and \*\*\*\* the rotation member 60 by the energization member 64. Therefore, as said idler gear 61 and input gear 63 rotate to the direction indicated by the arrow, respectively, it rotates to a counterclockwise rotation from the aperture condition which shows said shutter 48 in drawing 4 and it is shown in drawing 2, it closes. A deer is carried out, a toner cartridge 31 is pulled out from attachment crevice 30a of a development counter 13 with a handle 56, and it exchanges for the new toner cartridge 31. After exchange, if upper structure 10b is closed, as it is interlocked with and being mentioned above, a shutter 48 will be opened automatically.

[0033] In addition, the toner cartridge 31 mentioned above is good to consider as the configuration shown in drawing 5. The sign 70 in drawing is opening covering. The opening covering 70 bends both ends at a right angle, and forms bending section 70b while it forms partial cylinder curved-surface 70a in the shaft orientations of a toner cartridge 31 long and slender. And it plays to the outer edge of D mold shank 49 and shank 48b, and the bending section 70b is attached free [ rotation ]. Moreover, the balance controller 71 is formed in the periphery of bending section 70b. And the gravity balance of the opening covering 70 is maintained by the balance controller 71, and covering section 70a always considers as a sideways level condition.

[0034] If it rotates to the counterclockwise rotation which \*\*\*\* after putting in a toner cartridge 31 in installation crevice 30a of the development counter case 30 as shown in drawing 6 when carrying out a deer and attaching a toner cartridge 31 in a development counter 13, along with rotation of a toner cartridge 31, opening 46 will open downward. And as shown in drawing 7, the opening 46 of a toner cartridge 31 is attached

according to the opening 34 of a development counter 13. On the other hand, if the toner cartridge 31 is rotated to a clockwise rotation when removing a toner cartridge 31 from a development counter 13, along with rotation of a toner cartridge 31, opening 46 will serve as sideways, and covering section 70a will close the opening 46.

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[Translation done.]

**\* NOTICES \***

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2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] It is the state diagram before opening the upper structure and closing the upper structure after attaching a toner cartridge to a development counter by the laser beam printer which is one example of this invention.

[Drawing 2] It is the partial expanded sectional view of the circumference of the shutter at that time.

[Drawing 3] It is the state diagram which moreover closed the structure.

[Drawing 4] It is the partial expanded sectional view of the circumference of the shutter at that time.

[Drawing 5] In other examples of said toner cartridge, it is the expansion side elevation of an opening part.

[Drawing 6] It is the state diagram which put the toner cartridge on the development counter case.

[Drawing 7] The toner cartridge is attached and it is a state diagram at the time.

[Drawing 8] It is the decomposition perspective view of the toner cartridge which does not have said opening covering.

[Drawing 9] It is the condition explanatory view showing the recovery condition of the waste toner in a development counter equipped with the toner cartridge.

[Drawing 10] It is the perspective view showing the time of attaching a toner cartridge in the development counter.

[Drawing 11] They are a development counter after the toner cartridge installation, and the block diagram of the internal device of a toner cartridge.

[Drawing 12] It is the outline block diagram of the whole internal device of a laser beam printer equipped with these development counters and a toner cartridge.

[Drawing 13] It is the condition explanatory view showing the condition of opening the opening and supplying a toner after attaching a toner cartridge in a development counter in the conventional example.

[Drawing 14] It is the schematic diagram showing the time of attaching a toner cartridge in the development counter.

**[Description of Notations]**

10 Body of Equipment

10b Upper structure (covering)

13 Development Counter

31 Toner Cartridge

46 Opening

48 Shutter

60 Rotation Member

61 Idler Gear (Gear Train)

63 Input Gear (Gear Train)

64 Energization Member

70 Opening Covering

t Toner

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[Translation done.]

**\* NOTICES \***

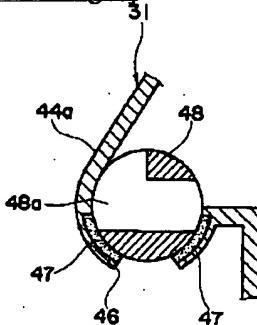
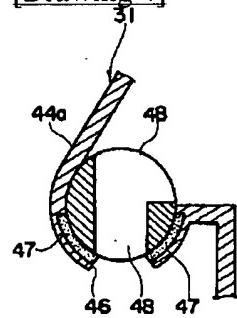
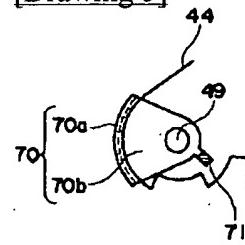
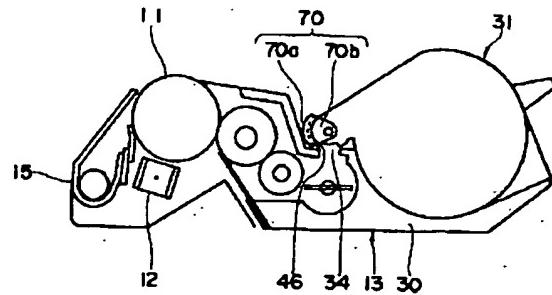
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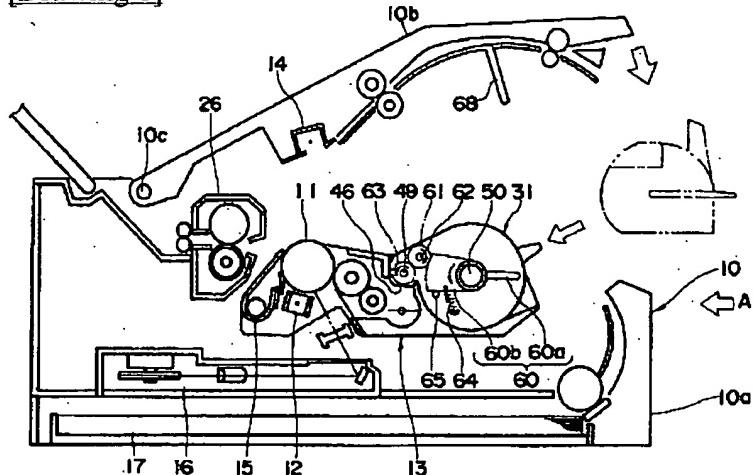
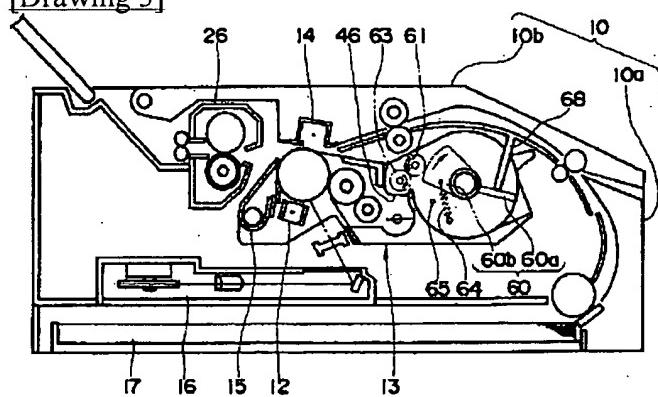
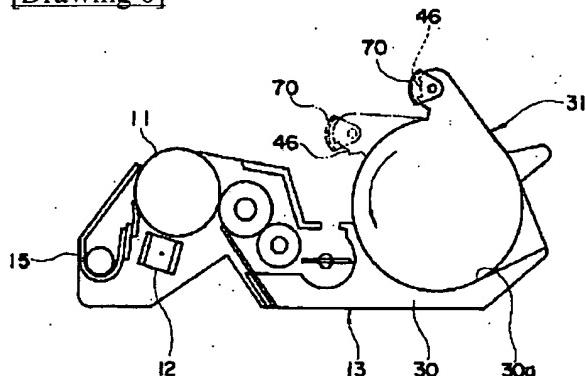
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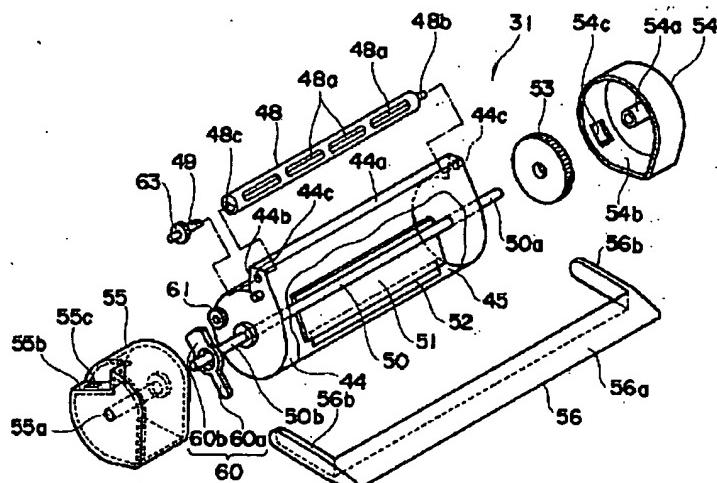
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**DRAWINGS**

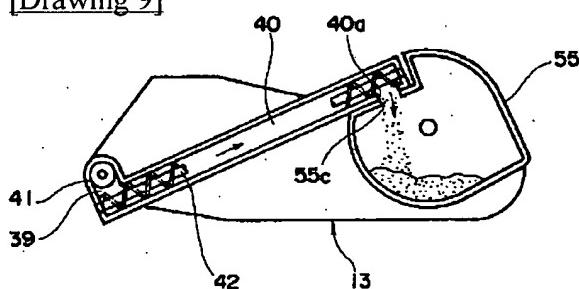
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**[Drawing 2]****[Drawing 4]****[Drawing 5]****[Drawing 7]**

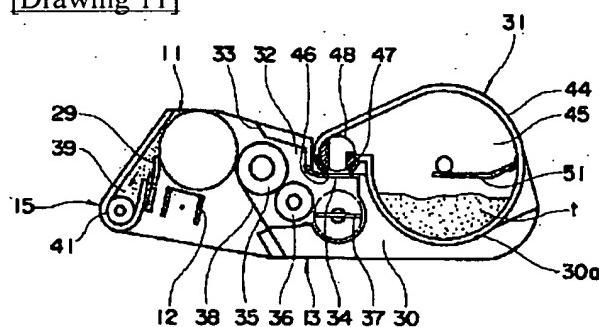
[Drawing 1][Drawing 3][Drawing 6][Drawing 8]



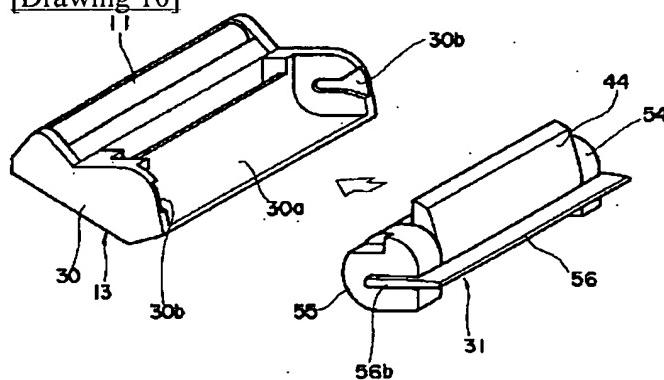
### [Drawing 9]



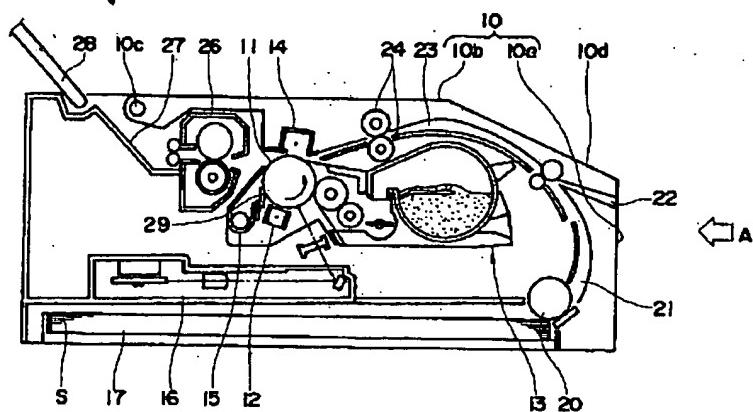
### [Drawing 11]



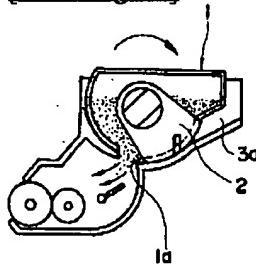
[Drawing 10]



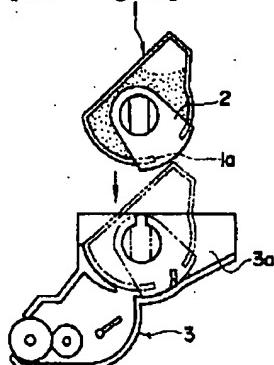
[Drawing 12]



[Drawing 13]



[Drawing 14]



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[Translation done.]

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(71)出願人 000006747

株式会社リコー

東京都大田区中馬込1丁目3番6号

(72)発明者 本橋 武

東京都大田区中馬込1丁目3番6号 株式  
会社リコー内

(72)発明者 田中 善朗

東京都大田区中馬込1丁目3番6号 株式  
会社リコー内

(72)発明者 丹澤 淳

東京都大田区中馬込1丁目3番6号 株式  
会社リコー内

(74)代理人 弁理士 中尾 俊介

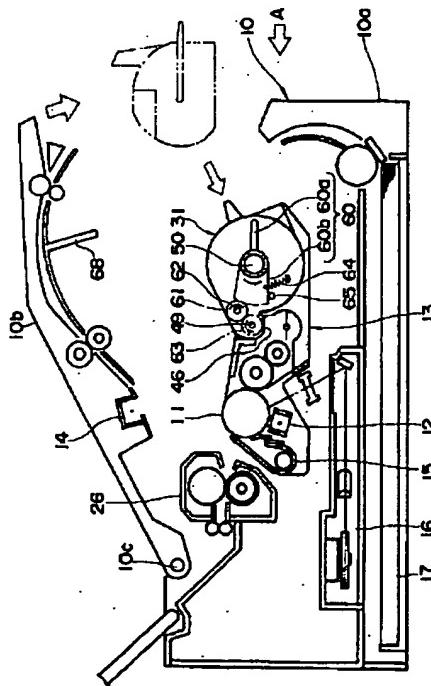
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(54)【発明の名称】 電子写真記録装置

(57)【要約】

【目的】 現像器にトナーカートリッジを取り付け後、トナーカートリッジのシャッタを開いてトナー補給を行うときの操作性の向上を図る。

【構成】 トナーカートリッジ31にその開口46を塞いでシャッタを回動自在に設け、そのシャッタの一端に入力ギヤ63を設けるとともに、入力ギヤ63と噛みあうアイドラギヤ61およびアイドラギヤ61と噛みあう回動部材60を設ける。回動部材60は、トナーカートリッジ31のアシテータ軸50の一端に自由回転自在に設け、その回動部材60に、シャッタを閉じる方向に付勢する付勢部材64の一端を掛けとめる。一方、上構造体10bに、閉じるとき回動部材60と係合し付勢部材64に抗してその回動部材60を回動する作動突部68を設ける。そして、現像器13にトナーカートリッジ31を取り付け後、装置本体10の上構造体10bの開閉動作に連動してシャッタを閉じまたは開く。



1

2

## 【特許請求の範囲】

【請求項1】 トナーカートリッジにその開口を塞いでシャッタを設け、そのトナーカートリッジを、装置本体に備える現像器に取り付けて前記シャッタを開き、前記装置本体のカバーを閉じて該装置本体を駆動し、前記トナーカートリッジ内のトナーを前記開口を通して前記現像器に補給し、その現像器で感光体上の潜像を現像する電子写真記録装置において、前記トナーカートリッジを前記現像器に取り付け後、前記カバーの開閉動作に連動して前記シャッタを開じまたは開いてなる、電子写真記録装置。

【請求項2】 前記カバーの開閉動作に連動して回動する回動部材と、その回動部材の回動を伝達する歯車列とを前記トナーカートリッジに備える一方、前記シャッタを径方向の貫通孔を有する軸状部材で形成し、それが前記歯車列を介して回動する構成としてなる、請求項1に記載の電子写真記録装置。

【請求項3】 前記シャッタを閉じる方向に付勢する付勢部材を設けてなる、請求項1に記載の電子写真記録装置。

【請求項4】 重力バランスで前記トナーカートリッジの着脱動作に連動して前記開口を開閉動作する開口カバーを、前記トナーカートリッジに備えてなる、請求項1に記載の電子写真記録装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 この発明は、レーザを用いた、プリンタ・複写機・ファクシミリなど、現像器にトナーカートリッジを取り付けてトナーを現像器に補給し、その現像器でトナーを付着して感光体上の潜像を現像する電子写真記録装置に関する。

## 【0002】

【従来の技術】 従来、レーザプリンタの中には、たとえば図14に示すように、トナーカートリッジ1にその開口1aを塞いでシャッタ2を回動自在に設けたものがある。そのようなレーザプリンタでは、現像器3の装着凹部3aに二点鎖線で示す如くトナーカートリッジ1を取り付け後、図13に示す矢示方向へ手で回動して開口1aを開き、トナーカートリッジ1内のトナーtを開口1aを通して現像器3に補給していた（特開平3-175471号公報参照）。

## 【0003】

【発明が解決しようとする課題】 しかしながら、そのような従来のレーザプリンタでは、現像器3にトナーカートリッジ1を取り付け後、トナーカートリッジ1を手で回動して開口1aを開かなければならず、面倒であった。

【0004】 そこで、この発明の目的は、現像器にトナーカートリッジを取り付け後、そのトナーカートリッジのシャッタを開いてトナー補給を行うとき、その操作性

の向上を図ることにある。

## 【0005】

【課題を解決するための手段】 そのため、請求項1に記載のものは、たとえば以下の図示実施例に示すとおり、トナーカートリッジ31にその開口46を塞いでシャッタ48を設け、そのトナーカートリッジ31を、装置本体10に備える現像器13に取り付けて前記シャッタ48を開き、前記装置本体10の上構造体10bのようなカバーを閉じて該装置本体10を駆動し、前記トナーカートリッジ31内のトナーtを前記開口46を通して前記現像器13に補給し、その現像器13で感光体11上の潜像を現像する電子写真記録装置において、前記トナーカートリッジ31を前記現像器13に取り付け後、前記カバーの開閉動作に連動して前記シャッタ48を開じまたは開いてなることを特徴とする。

【0006】 請求項2に記載のものは、たとえば以下の図示実施例に示すとおり、請求項1に記載の電子写真記録装置において、前記カバーの開閉動作に連動して回動する回動部材60と、その回動部材60の回動を伝達するたとえばアイドライギヤ61や入力ギヤ63からなる歯車列とを前記トナーカートリッジ31に備える一方、前記シャッタ48を径方向の貫通孔48aを有する軸状部材で形成し、それが前記歯車列を介して回動する構成としてなることを特徴とする。

【0007】 請求項3に記載のものは、たとえば以下の図示実施例に示すとおり、請求項1に記載の電子写真記録装置において、前記シャッタ48を開じる方向に付勢する付勢部材64を設けてなることを特徴とする。

【0008】 請求項4に記載のものは、たとえば以下の図示実施例に示すとおり、請求項1に記載の電子写真記録装置において、重力バランスで前記トナーカートリッジ31の着脱動作に連動して前記開口46を開閉動作する開口カバー70を、前記トナーカートリッジ31に備えてなることを特徴とする。

## 【0009】

【作用】 そして、請求項1に記載の発明では、トナーカートリッジ31を現像器13に取り付け後、装置本体10のカバーを開閉すると、それに連動してトナーカートリッジ31のシャッタ48を閉じまたは開く。そうして、シャッタ48を開いたとき、トナーカートリッジ31内のトナーtを開口46を通して現像器13に補給する。

【0010】 請求項2に記載のものでは、装置本体10のカバーの開閉動作に連動して回動部材60を回動し、その回動部材60の回動を歯車列を介してシャッタ48に伝達し、シャッタ48を回動して開口46を開閉する。

【0011】 請求項3に記載のものでは、付勢部材64でシャッタ48を開じる方向に付勢する。

【0012】 請求項4に記載のものでは、トナーカート

リッジ31の着脱動作に連動してその開口46を開口カバー70が重力バランスで閉閉する。

【0013】

【実施例】以下、図面を参照しつつ、この発明の実施例につき説明する。図12には、この発明の一実施例であるレーザプリンタの内部機構全体の概略構成を示す。

【0014】図中符号10は、装置本体である。装置本体10は、下構造体10aとそのカバーである上構造体10bとで構成し、その上構造体10bを下構造体10aに対し軸10cを支点として開閉自在に取り付ける。この装置本体10内には、そのほぼ中央に、ドラム状の感光体11を設ける。その感光体11のまわりには、下側の帯電器12から該感光体11の回転方向（反時計方向）に順に、右側に現像器13、上側に転写器14、左側にクリーニング器15を配置する。そして、帯電器12とクリーニング器15の下側には、光書き込み器16を備える。光書き込み器16のさらに下側には、給紙カセット17を着脱自在に取り付ける。給紙カセット17内には、シートSを収納する。そして、現像器13の右側、すなわち矢印Aで示す正面側には、給紙ローラ20を回転して送り出したシートSを上方へと導く給紙路21を備える。給紙路21の先には手差し給紙口22から挿入したシートSと共に搬送路23を設ける。その搬送路23の途中には、レジストローラ対24を配置する。

【0015】前記転写器14を間に挟んで、該レジストローラ対24と反対の側には、定着器26を備える。さらに、定着器26の左側に排紙路27を設け、その先に排紙受け28を設置する。なお、装置本体10には、正面側Aの上部傾斜面10dに表示パネル（図示省略）を備えてなる。

【0016】しかして、図示レーザプリンタでは、正面側Aに立ち、上記表示パネルを適宜操作する。そして、給紙ローラ20を回転してシートSを給紙カセット17内から一枚ずつ給紙路21へと送り出し、搬送路23を通してシートSの先端をレジストローラ対24に突き当てる止める。

【0017】一方、感光体11は、図中反時計方向に回転しながら、帯電器12でその表面を一様に帯電し、次に光書き込み器16でレーザ光を照射してその表面に静電潜像を形成し、続いて現像器13を通るときその静電潜像をトナーによって逐次可視化する。そして、その可視像とタイミングを合わせ、前述のレジストローラ対24に突き当っていたシートSを感光体11に向けて送り出す。しかし、その感光体11上の可視像を、転写器14によって該シートSに転写する。転写後、感光体11上の残留トナーは、クリーニング器15のクリーニングブレード29でかき落す。

【0018】他方、転写後のシートSを定着器26へと送り、その定着器26で転写画像を定着する。画像定着後、該シートSを排出して排紙路27を通して排紙受け

28上に順次にスタックする。

【0019】ところで、上述した現像器13は、図10および図11に示すように、現像器ケース30の一側に取付凹部30aを設け、その両端内面に取付ガイド凹部30bを設ける。また、この現像器ケース30は、他側に感光体11や帯電器12やクリーニング器15を一体的に取り付けてなる。しかして、感光体11の右側に現像室32を形成してなる。その現像室32の感光体11側には、その現像室32の長さ方向にローラ窓33をあけ、そのローラ窓33と反対の側には、上向きに開口する補給口34をあけてなる。そして、この現像室32内に、ローラ窓33から一部を露出して感光体11周面と接触する現像ローラ35と、その現像ローラ35に接触する補給ローラ36と、ミニアジテータ37とをそれぞれ回転自在に収納してなる。また、現像ローラ35の外周には、薄層ブレード38の先端を押し当ててなる。

【0020】前記クリーニング器15は、感光体11の長さ方向に廃トナーリサイクル室39を形成するとともに、その下部に第1オーガ41を回転自在に設ける。その廃トナーリサイクル室39の端部には、図9に示す廃トナーリサイクル室40の一端を接続してなる。廃トナーリサイクル室40は、図中右斜め上向きに形成し、内部に第2オーガ42を回転自在に設けとともに、他端に下向きのトナー廃棄口40aを設けてなる。

【0021】上述した現像器には、図10および図11に示すように、トナーカートリッジ31を着脱自在に取り付けてなる。トナーカートリッジ31は、図8に示すとおり、全体に円筒形状をなし、中央にトナー収納部44を備える。トナー収納部44は、内部にトナー室45

を形成するとともに、その外面に径方向の突部44aを軸方向に形成する。突部44aには、径方向にのびるカートリッジ接合面44bを設け、その接合面44bに図11に示す開口46をあけてなる。その開口46周縁には、内面にシール部材47を設けるとともに、そのシール部材47と接触して内部にシャッタ48を設ける。シャッタ48は、断面円形の軸状部材で、図8に示すように、径方向の貫通孔48aを複数形成するとともに、一端に軸部48bを、他端にD型軸孔48cをそれぞれ形成する。そして、トナー収納部44の一端側の軸孔44cに軸部48bを挿入する一方、D型軸孔48cにD型軸部49の一端を取り付けて回動自在に設ける。D型軸部49は、トナー収納部44の他端側の軸孔44cに挿入してなり、入力ギヤ63と一緒に設ける。

【0022】また、前記トナー収納部44には、長手方向に貫通してアジャスター軸50を設ける。そのアジャスター軸50の中間部には、板状のアジャスター51の基端を取り付けてなる。アジャスター51は、先端にポリエチレンフィルム52を取り付けてトナー室45の内壁面に押し当ててなる。

【0023】一方、アジャスター軸50の一端50a側に

は、アジテータギヤ53およびそのギヤカバー54を取り付ける。そのギヤカバー54は、キャップ状で、内底中心にアジテータ軸50の一端50aを押通する筒状突起54aを有するとともに、円筒状の側壁54bに開口54cを設けてなる。

【0024】他方、アジテータ軸50の他端50b側には、廃トナータンク55を取り付けてなる。廃トナータンク55は、全体にほぼ円筒状をなし、中心にアジテータ軸50の他端50bを押通する貫通孔55aを有し、外面に凹部55bを形成し、そこに廃トナー受け口55cをあけてなる。

【0025】さらに、アジテータ軸50の両端50a・50bに把手56の両端56bを取り付ける。把手56の両端56bは、中央の把持部56aの両端から直角に曲げ互いにほぼ平行に伸ばして形成してなる。そして、把手56の両端56bで挟んで前記ギヤカバー54および廃トナータンク55をアジテータ軸50上に固定する。

【0026】そして、このようなトナーカートリッジ31を現像器13に取り付けるときは、図1に示すように、装置本体10の正面側Aに立ってカバーである上構造体10bを開ける。そして、把手56を持って両端56bを図10に示す矢示方向から取付ガイド凹部30bにはめ込み、その取付ガイド凹部30bで案内してトナーカートリッジ31を取付凹部30a内に入れる。その後、図9に示すように、廃トナータンク55の廃トナー受け口55cをトナー廃棄口40aに合わせるとともに、トナー収納部44を反時計方向に回動して図11に示すように開口46を補給口34に合わせ、図1に示すごとくトナーカートリッジ31を現像器13に取り付ける。

【0027】さて、この実施例では、図1および図8に示すごとく、トナーカートリッジ31のトナー収納部44と廃トナータンク55間に回動部材60を設ける。回動部材60は、径方向に凸部60aとギヤ部60bを備え、前記アジテータ軸50の他端50b側に自由回転自在に取り付ける。その回動部材60のギヤ部60bと噛み合わせてアイドラギヤ61を設ける。アイドラギヤ61は、前記トナー収納部44の他端面に軸62で支持し、前記シャッタ48の入力ギヤ63と噛み合わせて設ける。また、前記回動部材60のギヤ部60b側には、付勢部材64の一端を掛け止めてなる。付勢部材64の他端は、トナー収納部44の適宜位置に掛け止める。そして、この付勢部材64で付勢して回動部材60のギヤ部60bを突起65につき当て、前記シャッタ48を図2に示す閉じ状態に保持する。

【0028】一方、前記上構造体10bには、前記回動部材60と係合してその回動部材60を回動する作動突部68を設ける。作動突部68は、棒状に形成し、先端を回動部材60に向けて下向きに設ける。

【0029】そうして、図1に示すようにトナーカートリッジ31を現像器13に取り付け後、上構造体10bを矢示方向へ回動して図3に示すように閉じると、操作部68の先端で駆動ギヤ60の凸部60aを押し下げ、付勢部材64に抗して駆動ギヤ60を矢示する時計方向へ回動する。すると、アイドラギヤ61および入力ギヤ63がそれぞれ矢示方向へ回転し、前記シャッタ48を図2に示す閉じ状態から時計方向へ回転して図4に示すよう開く。

【0030】しかして、記録時、現像器13では、図示省略する駆動モータからの回転をアジテータギヤ53を介してアジテータ軸50に伝達し、それを回転してアジテータ51を回動する。そして、図11に示すように、アジテータ51でトナーtを攪拌しながらトナー室45から貫通孔48aおよび開口46を通して補給口34から現像室32内へと送り込む。そして、その送り込んだトナーtをミニアジテータ37で補給ローラ36に送り、さらに補給ローラ36で現像ローラ35に付着する。その付着したトナーtは、薄眉ブレード38の先端でせき止めて薄層化する。しかし、このトナーtを現像ローラ35でローラ窓33を通して感光体11に付着し、感光体11表面の静電潜像を可視像化する。

【0031】そして、転写後、感光体11上の残留トナーtは、クリーニング器15のクリーニングブレード29で廃トナー回収室39にかき落す。しかし、該廃トナーtを、第1オーガ41の回転で廃トナー回収室39の端部側に運び、さらに、図9に示すように、第2オーガ42の回転で廃トナー搬送路40を通して搬送し、トナー廃棄口40aおよび廃トナー受け口55cを通して廃トナータンク55内に回収する。

【0032】その後、トナーtがなくなり、前記表示パネルにトナーカートリッジ31の交換表示がなされたときは、図1に示すように、上構造体10bを開く。すると、作動突部68が回動部材60から離れ、その回動部材60を付勢部材64で付勢して矢示する反時計方向へ回動する。そのため、前記アイドラギヤ61および入力ギヤ63がそれぞれ矢示方向へ回転し、前記シャッタ48を図4に示す開き状態から反時計方向へ回転して図2に示すように閉じる。しかし、把手56を持ってトナーカートリッジ31を現像器13の取付凹部30aから引き出し、新しいトナーカートリッジ31と交換する。交換後、上構造体10bを閉じると、それに連動して上述したようにシャッタ48を自動的に閉く。

【0033】なお、上述したトナーカートリッジ31は、図5に示す構成とするとよい。図中符号70は、開口カバーである。開口カバー70は、トナーカートリッジ31の軸方向に部分円筒曲面70aを細長く形成するとともに、両端を直角に曲げて曲げ部70bを形成する。そして、その曲げ部70bをD型軸部49および軸

50 部48bの外端に遊び回動自在に取り付ける。また、曲

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げ部70bの外周には、バランス調整部71を設ける。そして、バランス調整部71で開口カバー70の重力バランスを保ち、カバー部70aが常に横向きの水平状態とする。

【0034】しかして、トナーカートリッジ31を取り付けたとき、図6に示すように、現像器ケース30の取り付け凹部30a内にトナーカートリッジ31を入れてから矢示する反時計方向へ回動すると、トナーカートリッジ31の回動につれて開口46が下向きに開く。そして、図7に示すように、トナーカートリッジ31の開口46を現像器13の補給口34に合わせて取り付ける。他方、トナーカートリッジ31を現像器13から取り外すときは、そのトナーカートリッジ31を時計方向へ回動すると、トナーカートリッジ31の回動につれて開口46が横向きとなり、その開口46をカバー部70aで塞ぐ。

## 【0035】

【発明の効果】したがつて、この発明によれば、トナーカートリッジを現像器に取り付け後、装置本体のカバーを開閉すると、それに連動してトナーカートリッジのシャッタを開じまたは開くので、シャッタを開いてトナーを補給するときに、たとえばシャッタを手で開く面倒をなくし、操作性を向上させることができる。

【0036】請求項3に記載のものによれば、付勢部材でシャッタを閉じる方向に付勢するので、シャッタを確実に閉じることができる。

【0037】請求項4に記載のものによれば、トナーカートリッジの着脱動作に連動してその開口を開口カバーで開閉するので、現像器からトナーカートリッジを外すとき、開口を開口カバーで被ってその開口に付着したトナーが外部に飛散することを防止することができる。

## 【図面の簡単な説明】

【図1】この発明の一実施例であるレーザプリンタで、上構造体をあけて現像器にトナーカートリッジを取り付け後、上構造体を閉じる前の状態図である。

【図2】そのときのシャッタまわりの部分拡大断面図である。

【図3】その上構造体を閉じた状態図である。

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【図4】そのときのシャッタまわりの部分拡大断面図である。

【図5】前記トナーカートリッジの他の例で、開口部分の拡大側面図である。

【図6】そのトナーカートリッジを現像器ケースに載せた状態図である。

【図7】そのトナーカートリッジを取り付けときの状態図である。

【図8】前記開口カバーを有しないトナーカートリッジの分解斜視図である。

【図9】そのトナーカートリッジを備える現像器における廃トナーの回収状態を示す状態説明図である。

【図10】その現像器にトナーカートリッジを取り付けたときを示す斜視図である。

【図11】そのトナーカートリッジ取り付け後の現像器とトナーカートリッジの内部機構の構成図である。

【図12】それら現像器およびトナーカートリッジを備えるレーザプリンタの内部機構全体の概略構成図である。

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【図13】従来例で、現像器にトナーカートリッジを取り付け後、その開口を開いてトナーを補給する状態を示す状態説明図である。

【図14】その現像器にトナーカートリッジを取り付けたときを示す概略図である。

## 【符号の説明】

10 装置本体

10b 上構造体(カバー)

13 現像器

31 トナーカートリッジ

46 開口

48 シャッタ

60 回動部材

61 アイドラギヤ(歯車列)

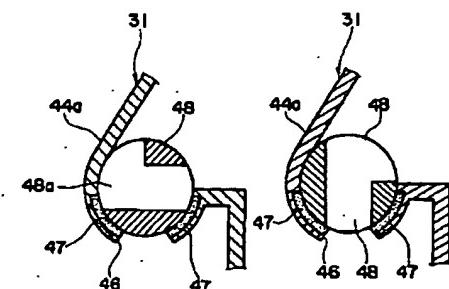
63 入力ギヤ(歯車列)

64 付勢部材

70 開口カバー

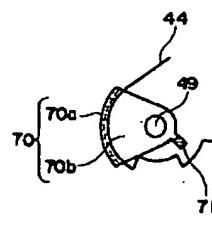
t トナー

【図2】

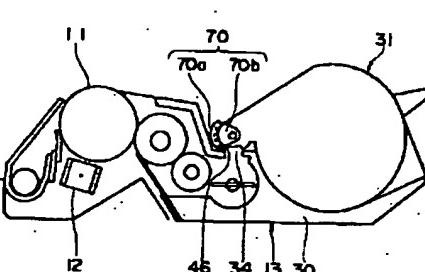


【図4】

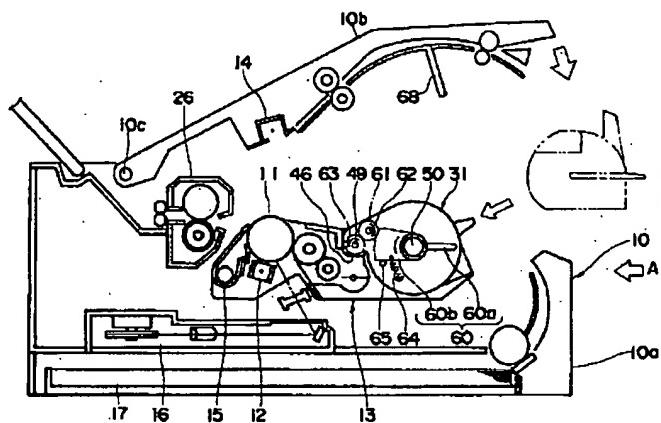
【図5】



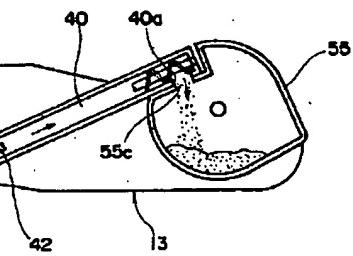
【図7】



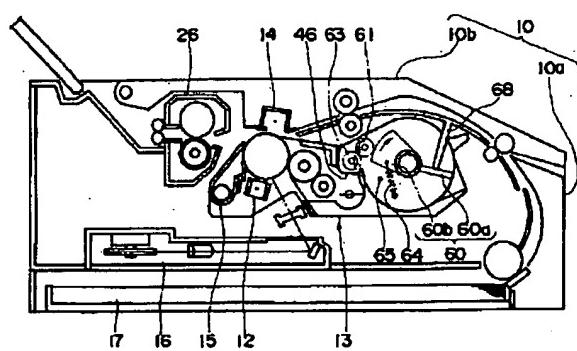
【図1】



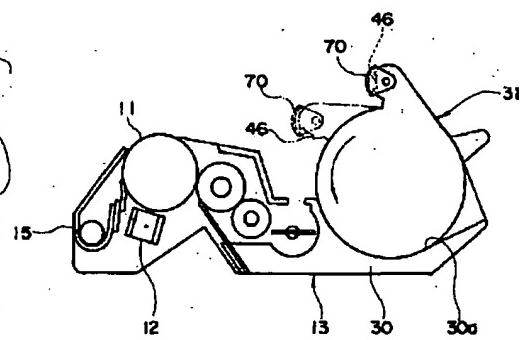
【図9】



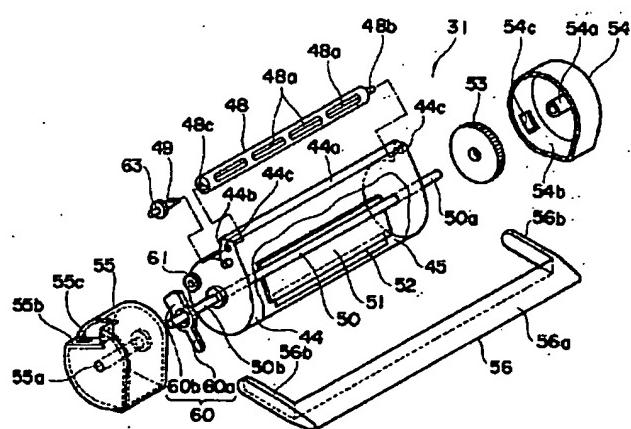
【図3】



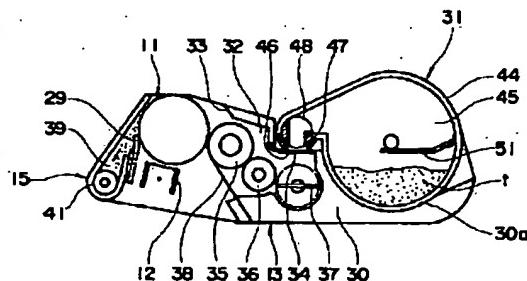
【図6】



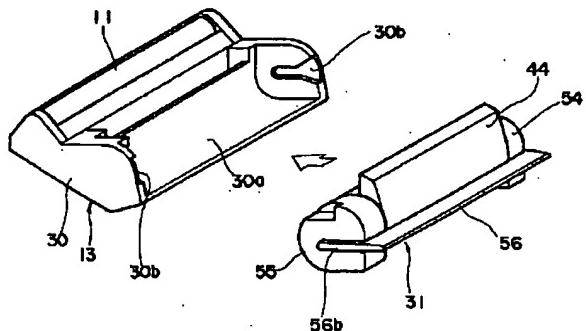
【図8】



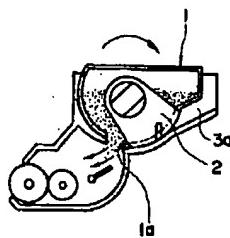
【図11】



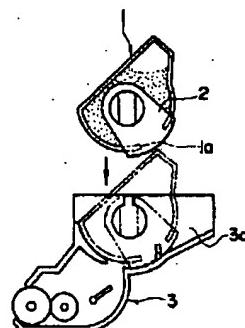
【図10】



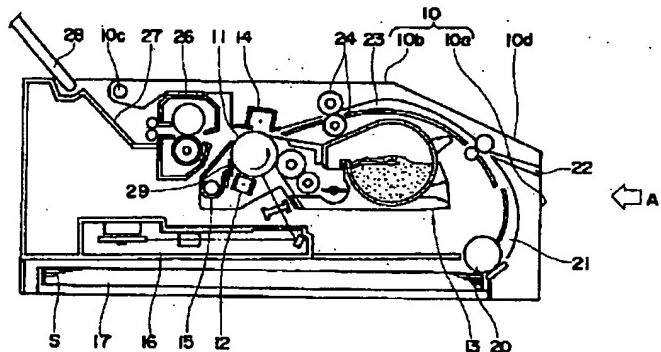
【図13】



【図14】



【図12】



## フロントページの続き

(72)発明者 松前 嶽  
東京都大田区中馬込1丁目3番6号 株式  
会社リコー内

(72)発明者 宮本 真義  
東京都大田区中馬込1丁目3番6号 株式  
会社リコー内

(72)発明者 田宮 孝弘  
東京都大田区中馬込1丁目3番6号 株式  
会社リコー内